

REMARKS

The Office action dated June 2, 2009, and the references cited therein have been received and carefully reviewed.

The rejection of claims 15-17 and 19-20 under 35 U.S.C. §112, second paragraph, is obviated by appropriate amendment.

Specifically, claim 15 has been amended to delete the term "more or less", and claim 19 has been amended to include the definitions for B and Y, which were erroneously omitted from the claim. It will be noted that the definitions for B and Y in claim 19 are the same as for claim 1.

Accordingly, it is believed that the rejection of claims 15-17 and 19-20 under 35 U.S.C. §112, second paragraph, has been overcome. Favorable reconsideration and withdrawal of the rejection is thus respectfully urged.

The rejection of claims 1-7 and 15-19 under 35 U.S.C. § 102(b) as being anticipated by DE 10117338 is respectfully traversed.

It is submitted that the DE 10117338 reference does not disclose the presently claimed invention for the following reasons.

As discussed in Applicants' previous response, a critical aspect of the present invention is that the hardener is in the form of an amino functional sol, a nanoparticle-based mixture

which is extremely stable.

In order to be suitable as an industrially applicable hardener for epoxy resins, the hardener must be in compliance with the following requirements:

1) The hardener must not contain volatiles, or only an extremely low content of volatiles.

In the present invention, volatiles are distilled off by vacuum distillation (typically 110°C and 20 mbar; Examples 1-4).

2) The hardener must be fast curing at ambient temperatures.

In the present invention, fast curing at ambient temperatures is demonstrated in Examples 6-11 (preheating of the epoxy resin to 40°C was done to remove air bubbles in the mixture).

3) The hardener must be readily miscible with epoxy resins yielding mixtures with appropriate viscosity and processibility.

In the present invention, these properties are clearly demonstrated in Examples 6-11.

4) The hardener must have a long shelf-life.

In the present invention, these properties are clearly indicated by the stability of the hardener during vacuum

distillation (typically 110°C and 20 mbar - Examples 1-4).

Accordingly, the present application discloses an epoxy hardener comprising a sol based on a silane comprising an amino functional group which fulfils all of the requirements for a hardener.

To the contrary, DE 10117338 describes a coating composition based on (a) a polyepoxide, (b) amino functionalized nano particles prepared by hydrolysis of an aminosilane, and (c) a cross-linkable fluorine compound.

The removal of volatile reaction products from the hydrolyzed aminosilane is not disclosed in DE 10117338. In Example 1 of DE 10117338, which is the only example for the preparation of component (b), the use of a large excess of ethanol in relation to the silane is disclosed. The Example shows that neither ethanol nor the reaction product methanol is removed. The maximum content of aminofunctionalized nano particles in component (b) is therefore below 10% w/w.

In DE 10117338, curing of the coating composition is carried out at 35°C, which is far above ambient curing thermosets comprising an epoxy resin and a hardener containing amino groups. Curing of thermosets comprising an epoxy resin and component (b) as hardener at ambient temperatures will therefore not be possible or far too slow for industrial

applications. The use of organic solvents is very unusual in thermosets comprising an epoxy resin and a hardener containing amino groups. Low VOC emission is a major advantage of such thermosets. Furthermore, the emission of methanol from thermosets comprising an epoxy resin and a hardener containing amino groups is not acceptable at all.

Example 1 of DE 10117338 also discloses that component (b) has to be stored for three days after the manufacturing process is finished. This indicates the requirement for a further maturing and the lack of stability of component (b). Component (b) of DE 10117338 is therefore not industrially applicable as a hardener for epoxy resins.

The Examiner's position that the hardener of DE 10117338 would be inherently capable of producing materials with a high abrasion resistance, photostability and chemical resistance is thus incorrect.

Accordingly, since DE 10117338 fails to disclose or suggest an epoxy hardener in the form of a sol prepared by controlled hydrolysis and condensation as defined by the present invention, it is believed that the rejection of claims 1-7 and 15-19 under 35 U.S.C. 102(b) is unsustainable and should be favorably reconsidered and withdrawn.

The rejection of claims 2-7 under 35 U.S.C. 103(a) as

being unpatentable over DE 10117338 in view of Hata et al. (US 6,033,749) is respectfully traversed.

As discussed above, DE 10117338 fails to disclose or suggest an epoxy hardener in the form of a sol prepared by controlled hydrolysis and condensation, as defined by the present invention.

The Hata et al. reference also fails to disclose or suggest an epoxy hardener in the form of a sol prepared by controlled hydrolysis and condensation, as defined by the present invention.

It follows that a combination of the DE 10117338 and Hata et al. references would not lead a person of ordinary skill in the art to Applicants' invention. Accordingly, the rejection of claims 2-7 under 35 U.S.C. 103(a) should be favorably reconsidered and withdrawn.

Applicants respectfully traverse the provisional rejection of claims 1-7 and 15-17 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of the claims of US 2007/0290176; the provisional rejection of claims 1-7 and 15-17 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of the claims of US 2007/0260030; and the provisional

rejection of claims 1-4, 7, and 15-20 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of the claims of US 2008/0039607.

Each of the cited applications were filed (and published) after Applicants' October 16, 2002, invention date, and are therefore not prior art. Clearly, neither of the cited publications discloses a hardener for curing epoxy resins or a method for curing epoxy resins, as presently claimed.

As such, the provisional rejections of claims 1-7 and 15-17 on the ground of nonstatutory obviousness-type double patenting based on US 2007/0290176, US 2007/0260030, and US 2008/0039607 are unsustainable and should be withdrawn.

Applicants submit that the present application is now in condition for allowance and early notice of such action is earnestly solicited. If any final points remain that can be clarified by telephone, Examiner Feely is respectfully encouraged to contact Applicants' attorney at the number indicated below.

Applicants hereby petition the Commissioner for Patents to extend the time for reply to the notice dated June 2, 2009, for one (1) month from September 2, 2009, to October 2, 2009.

effect payment of the extension fee.

Respectfully submitted

A handwritten signature in dark ink, appearing to read "Malcolm J. MacDonald", written in a cursive style.

Date: October 2, 2009

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